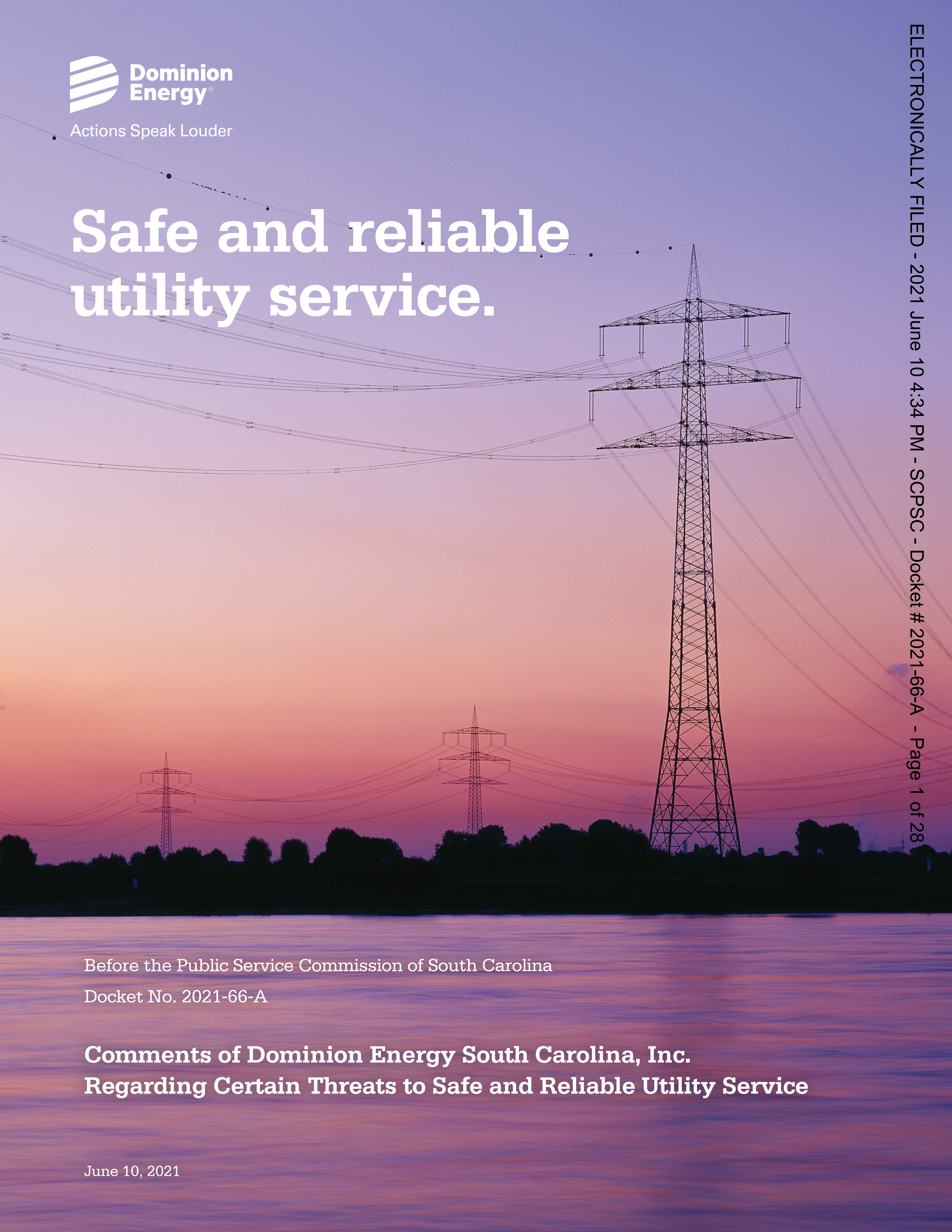

Dominion Energy®

Actions Speak Louder

Safe and reliable utility service.

Before the Public Service Commission of South Carolina

Docket No. 2021-66-A

Comments of Dominion Energy South Carolina, Inc.
Regarding Certain Threats to Safe and Reliable Utility Service

June 10, 2021

Dominion Energy

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Introduction

The blackouts that occurred in Texas in 2021 were tragic on many levels.

Dominion Energy lineman ensuring reliable service.

The Genesis of the Present Proceeding

On February 20, 2021, the South Carolina Office of Regulatory Staff ("ORS") petitioned the Public Service Commission of South Carolina (the "Commission") asking the Commission to request comments from South Carolina utilities concerning the extended blackouts that occurred between February 10 and 20, 2021 in the State of Texas. ORS did so at the request of the Honorable Henry D. McMaster, Governor of the State of South Carolina, who sought information about the ability of the utility systems in South Carolina to respond to extreme winter conditions.

On February 22, 2021, the Commission opened the present docket requesting comments related to "measures that have been, or will be taken, to: 1) mitigate the negative impacts of ice storms and other dangerous weather conditions to the provision of safe and reliable utility service, and 2) ensure peak customer demands on the utility system can be met during extreme weather scenarios." Order No. 2021-163.

The blackouts that occurred in Texas in 2021 were tragic on many levels. More than 150 lives were lost. Families were disrupted, the state's economy was paralyzed, companies were bankrupted, confidence in government and utilities was deeply injured, and careers were cut short. It is important for the Commission, ORS and the leadership of this State to ask whether such disruption could occur in South Carolina and what is being done to prevent it.

Executive Summary

The recent Texas weather event comprised three winter storms that passed through that state in close succession between February 10 and February 19, 2021. Temperatures in Northern and Central Texas remained below freezing for nearly two hundred hours.[1] On February 15^{th} and 16^{th}, average temperatures were as low as 40 degrees colder than normal. Texas's electric generation and natural gas assets were ill-prepared and many failed due to freeze-up and icing. Widespread electricity blackouts and gas supply failures lasted without interruption over many days. All told, approximately five million customers lost power.

While a weather event of this type is possible in South Carolina, a review of 128-year weather data indicates a similarly extreme, sustained, multi-day weather event is unlikely to occur in DESC's service territory. However, on January 7, 2014, a less extreme cold weather event caused DESC to lose approximately 20% of its generation capacity during the morning peak. To protect the integrity of the gird, the Company implemented controlled rolling blackouts that affected approximately 7% of its customers. The average outage was 39 minutes. Service to all customers was restored before noon that day.

After that event, DESC conducted a comprehensive review of its generation assets and its storm planning and

[1] The data set used throughout this discussion is for Dallas-Fort Worth.

response protocols. Over seven months, DESC invested approximately $40 million to harden its generation assets to withstand temperatures as low as 0 degrees coupled with sustained high winds of 30 miles per hour. DESC also implemented comprehensive new weather planning and operating protocols, established new storm staffing responsibilities, identified storm response coordinators for its generation system and implemented new dedicated storm preparation and response communications systems.

Market Structure and Regulation

As a vertically integrated utility, DESC owns and controls the key generation, transmission, and distribution assets it uses to serve its customers reliably. That is not how utilities are structured in Texas. In deregulating its electricity sector, Texas replaced vertical integrated utilities with a system of day-ahead and real-time electricity markets and unregulated power producers. The state allowed its policies to evolve in ways that eroded the incentives for generation owners to invest in reliability and resiliency. Under the stress of extreme weather, Texas's regulatory policies and generating units and gas supply failed its people with disastrous results.

As South Carolina's utilities move toward a net-zero carbon future, the state will face important policy choices concerning the steps necessary to preserve reliability and customer affordability. DESC currently operates four generating units that burn, or have the ability to burn, coal. These units represent 1,704 MW of dispersed, dispatchable generation that today are critically important in maintaining reliability. As DESC retires these units, it will need to deploy a variety of grid resources which collectively can provide comparable operational attributes to ensure continued reliably. These resources can include advanced dispatchable low- and carbon-free generation that will contribute to the greening of the fleet where such technology is available.

Additional reliability challenges will arise as additional sectors of the economy like transportation and industrial processes turn to electricity as a primary source of energy to reduce carbon emissions. DESC's system already bears the challenge of reliably serving customers in its rapidly growing urban and coastal service areas. The addition of new electric loads and the increasing dependence of the economy on electricity will increase reliability and resiliency challenges and increase the stakes.

Deferred reliability investments create weaknesses in the grid that accumulate quietly over time. Poorly maintained lines, rights-of-way and generating stations, and an unbalanced generation portfolio, may function well enough when stress on the system is low. But, during a major storm or peak load event, the true costs reveal themselves. When the electric grid does fail, it is usually when customers are facing intense heat or cold, or are struggling to recover from storm damage to their communities. This magnifies the damage and disruption caused by grid failure. In the Texas winter storm event, the combination of blackouts and freezing cold caused over 150 deaths and as much as $190 billion in property damage. Reliability comes with a cost, but in the long run, inadequate reliability is even more costly.

State utility regulation is the bedrock on which the reliability of South Carolina's electric and natural gas systems rests. Only a financially healthy utility can afford to make the investments required for reliability. A utility's financial health depends on regulatory policies that provide compensatory rates to allow it to recoup its investments in utility infrastructure.

The longer investment in a utility system is deferred, the more expensive it will be to restore reliability. The longer compensatory rates are denied, the larger the rate increases that will be required to maintain the financial health of the utility and the reliability of its operations.

Between 2011 and 2019, DESC invested $1.0 billion in new transmission assets, $1.1 billion in new distribution assets and over $878 million in its generation fleet. This $3 billion outlay included critical reliability investments that are now providing high levels of reliability and resiliency for customers. The Company's request for rates to recoup its investments in its system is presently before the Commission in the Company's 2020 electric base rate case.

DESC's Reserve Margin

DESC's electric system currently maintains a winter reserve margin of 21% to support reliability during extreme winter weather conditions and plant outages. This reserve margin is calculated to be sufficient to cover customers' demands in all but one day every ten years based on weather patterns from 1991-2020. This level of risk is consistent with industry standards.

Should DESC experience a generation deficit due to unexpectedly extreme weather or widespread plant outages, it would call on other utilities and Emergency Service from the Virginia-Carolina ("VACAR") Reserve Sharing Arrangement if available. If not, it would implement customer standby generation programs, ask the public to conserve energy, and interrupt its interruptible customers. If these steps were not sufficient, it would institute controlled load shedding.

As was the case in 2014, DESC expects that any such controlled load shedding would be limited in scope and duration affecting a small percentage of customers for a brief period of time. The alternative to accepting some risk of controlled load shedding would be for DESC to invest in expensive generation assets that might not be needed but once or twice every few decades. DESC believes that under this approach the cost to customers would be disproportionate to the risks involved.

Ice Storms and Other Storms

DESC's approach to mitigating the effect of ice storms and other winter weather events is based on its core commitments of safety, reliability and resiliency. DESC's employees are trained to carefully identify safety risks, to take personal responsibility for addressing them, and to anticipate the effects of their actions before they act. Safety is the foundation of professionalism in utility operations. DESC's safety record is extraordinary for both its electric system (accident rates less than one-third the southeastern average in 2019) and natural gas system (recognized by the American Gas Association in 2020 as having the lowest accident rates of any large to medium-sized gas utility nationwide). This cultural strength extends to protecting the safety of the public as well.

In 2019, DESC provided its customers a level of reliability that was forty-nine percent better than the other regional investor-owned utilities evaluated by the State Energy Office. On average from 2014 to 2020, the forced outage rate for DESC's fossil steam generating units was only about 25% of the national average despite having a generation fleet with a median age of more than 50 years. While these aged units operate with remarkable reliability, they are inefficient in terms of fuel usage and limited in operational flexibility by modern standards. Their replacement must be addressed in the coming years.

Over the past decade, DESC has achieved important reliability gains through disciplined vegetation management (tree trimming) programs; equally disciplined programs for inspection and replacement of poles, switches, insulators and other assets in the field; and routine inspection, testing, refurbishing and replacing of generation unit components as they age.

DESC's track record in responding to recent storms is equally impressive. The number of customers whose lights go out in a major storm (reliability) has dropped substantially over the past decade. The time it takes to get them reconnected (resiliency) is being reduced. After Hurricane Dorian, 186,000 customers were reconnected in less than four days.

DESC's Storm Emergency Operations team is well organized, well-staffed, and fully integrated with State Emergency Management Command Center. DESC's customer communication groups use diverse, technologically-sophisticated means to communicate with customers during weather events, using app-based and website-based tools to provide outage reporting and up-to-date restoration status information. Customers that depend on electric service because of disabilities or medical conditions ("White Cross Customers") are directly contacted with assistance in locating shelters and meeting other needs.

The events in Texas showed clearly how reliability is determined by regulatory policies and market structures. This is true in South Carolina as well. All entities in South Carolina that are involved in formulating utility policy, determining market structures and setting rates share responsibility for ensuring grid reliability. This includes the ORS, the Commission, the General Assembly, and the Governor, as well as utilities and other stakeholders. The State's regulatory policies either will support investments in reliability or they will not. That choice will do much to determine future outcomes for customers in South Carolina when severe weather puts utility systems to the test.

Our Comments

Reliability, Restructuring and the Recent Events in Texas

Customers' overriding demand is, ***'Keep the lights on,'*** or on the gas system, ***'Keep the gas flowing.'***

Dominion Energy lineman preparing material for service.

Customers' overriding demand is, ***'Keep the lights on,'*** or on the gas system, ***'Keep the gas flowing.'*** These were the expectations that deregulated Texas utility systems were tragically unable to meet.

For DESC, reliability/resiliency—along with safety and efficiency—are core values that guide all aspects of managing its utility systems and recruiting and training the more than 3,000 employees that serve its customers.

DESC's employees understand that they collectively manage all aspects of the electric system that serves their families, neighbors and communities. They know all too well how much the communities in which they live depend on them to do their jobs well. Because DESC is a vertically integrated utility, the relationship between how employees do their jobs and the service that their communities receive is direct and apparent.

That direct relationship was absent in Texas. In deregulating its electricity system, Texas substituted market structures and contractual obligations for vertical integration. Texas organized its electric system around deregulated electricity markets operated by the Electric Reliability Council of Texas ("ERCOT"). ERCOT has primary responsibility for grid reliability, but does not own or operate the power plants that make its electricity, nor does ERCOT own transmission or provide service to end use customers. Within ERCOT, generating plants are paid for the electricity they sell so their primary concern is maximizing immediate contractual returns. Merchant plants in ERCOT operate at arm's-length from customers and communities. There is little incentive for them to spend money to ensure reliability for retail customers absent a direct, contractual pay-back. Neither reliability nor resiliency is their primary responsibility.

In designing its electric markets, ERCOT relied on an energy-only design without a forward market for capacity. This design allowed merchant power plant owners to be paid up to $9,000.00 per MWh hour ("MWh") during times of scarcity, compared to a price of $40 MWh or less under ordinary conditions. But that incentive was inadequate to ensure that a sufficient number of these generators invested in cold hardening technology before the 2021 blackouts, even though this technology was readily available. Plants that did generate during the times of distress on the Texas system received windfalls. For some, revenues from a single day of operations approached typical revenues for an entire year. Texas customers that opted for variable rates paid for those windfalls. Some ended up owing thousands of dollars for a few days of electricity.

DESC's system is quite different. Rates are regulated. There are no windfalls nor are there disincentives to investing so long as the project is prudent and necessary and the Commission is willing to set rates that allow the costs to be fairly recouped. That is why when the winter storm of 2014 revealed the need for cold hardening, DESC's employees immediately identified what was needed to improve the weatherization of the generation system, and the Company invested approximately $40 million in these improvements within less than a year. This amount is part of the investment in utility assets for which DESC seeks a fair return in its current electric rate proceeding. That is how reliability is sustained in a vertically integrated utility.

What impact will the transition of the utility industry towards a net zero carbon future have on reliability issues like those experienced in Texas?

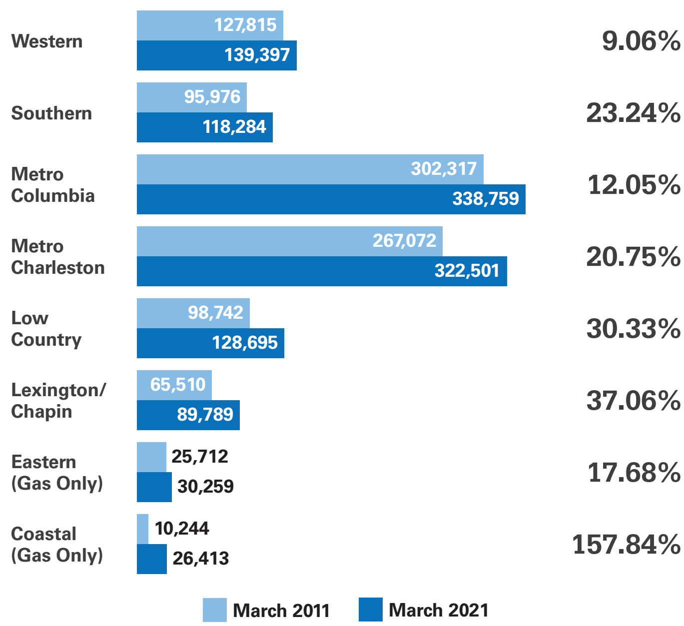
In February of 2020, Dominion Energy announced a corporate-wide goal of achieving net zero carbon and methane emissions by 2050. In so doing, it aligned itself with a broad, societal consensus that aggressively addressing carbon emissions is especially important to the well-being of the nation and the world.

DESC intends to provide a robust response to the challenge of climate change while continuing to maintain the reliable and affordable electric service upon which our customers depend. Balancing these goals is a challenge DESC is confident it can meet given the successful track record of reliable and cost-effective utility operations across the Dominion Energy system. Meeting this challenge will mean embracing proven technologies such as quick-start, renewable-enabling combustion turbine generation while continuing to promote nascent renewable technologies such as green hydrogen. Given the limitations of current commercially available technologies (including utility-scale batteries), continued development of advanced technologies (some of which may be in their conceptual stages at present) will play a critical role in DESC's achieving its net zero goal while providing reliable and affordable service to customers. Deploying a combination of existing and emerging technologies can allow DESC to continue to decarbonize expeditiously while meeting its customers' expectations concerning cost and reliability.

In the meantime, as DESC transitions towards a net zero carbon future, several coal plants that have been important historically in managing grid reliability will need to be retired. As DESC's grid is configured today, the generating capacity and reliability attributes that these coal units provide are necessary for meeting customers' demands throughout the year, especially in peak periods. For that reason, these units will need to be replaced with renewable and lower carbon resources that alone or in combination provide the dispatchable, all-weather, long-duration MW needed to reliably serve customers. Without providing for replacements with those collective operating attributes, grid reliability cannot be maintained.

Going forward, the decarbonization of the economy will also place important new demand pressures on DESC's electrical system. Other sectors of the economy like transportation and industrial processes are expected to transition to electricity as their sole or predominant fuel. The demand pressures that result will be in addition to those caused by the rapid customer growth in urban and coastal areas on DESC's system, as shown on Figure A. Supporting reliability in response to these demands will require careful planning and significant capital investment.

Figure A: South Carolina Gas and Electric Customer Growth by District/Region Over a 10-year Period[2]



[2] There is some overlap among the regions.

Adding non-dispatchable, intermittent renewable resources, or energy-limited storage resources will not be enough to ensure reliability in the face of these challenges. For all their virtues, these resources must be backed up by dispatchable, all-weather, long-duration resources to ensure reliable service to customers during times of extreme weather or peak demand.

The current transition in the electric industry will test the regulatory system in South Carolina. The reliability challenge it poses can be met, but is not without risk. Serious reliability mistakes are possible in this transition just as we now understand that Texas made punishing mistakes in the reliability choices it made in deregulating its electric industry. South Carolina's success in managing this transition will depend on how well policy makers and regulators understand the important features of the electric grid and how market structures, reliability policies and rate making decisions affect customer reliability outcomes over the long term. All policy makers, utilities and customers share an interest in ensuring that regulation, ratemaking and public policy support utility system reliability.

Is it possible that weather patterns similar to those experienced in Texas will occur on DESC's system?

It is possible but unlikely that South Carolina will experience weather conditions similar to those observed in Texas. The Texas event involved:

- One day with a daily average temperature of nine degrees or colder;
- Two consecutive days with minimum temperatures of four degrees or colder; and
- Three consecutive days with minimum temperatures of eighteen degrees or colder.

Applying these criteria to 128-year weather data sets (1893-2021) shows a similar event has never occurred in DESC's service territory. Since 1930, temperatures in DESC's service territory have been in single digits for only 11 out 32,850 total days. Since 1893, a temperature of less than 0 degrees (-2 degrees) has been recorded only one time for one hour.

Based on the historical record, extended periods of extreme cold like those experienced in Texas are not reasonably foreseeable in this area. While nothing is impossible, the historical record does not establish that a weather event comparable to that in Texas is likely enough to occur in DESC's service territory for it to be used as a model for planning and investment in DESC's system.

In addition, even if weather comparable to that experienced in Texas were to occur in South Carolina, the effects would be different. As discussed in more detail below, DESC has invested in cold hardening its generation system which Texas did not do. Unlike Texas, DESC is interconnected with neighboring electric utility systems that may be able to provide support for its electric grid of the sort that Texas could not access.

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Our Comments

Planning the Electric System to Meet Customers' Energy Demands During Extreme Weather Events

DESC plans its electric system to meet the customers' electric energy demands under the most extreme weather events that have occurred in its service territory since 1991.

The Texas winter storm event does raise valid questions: What extreme weather events does DESC prepare for? How does DESC forecast customer demands under those extreme weather conditions? How confident should the State be that DESC has taken the appropriate steps to prepare for extreme weather conditions?

How does DESC determine the amount of electric generating and transmission capacity that is needed to meet customers' extreme winter weather demands?

DESC plans its electric system to meet its customers' electric energy demands under the most extreme weather events that have occurred in its service territory since 1991. The coldest day during that period was January 18, 1994. If that weather were to reoccur today, the updated peak demand would be 5,412 MW which is 557 MW higher than the normal winter peak. The 557 MW difference is the ***demand*** risk which DESC considers in designing its generation and transmission system.[3]

DESC then adds to the 557 MW demand risk an amount of generation calculated to be sufficient to cover the generation capacity that is likely to be offline at the time of system peak—this could be due to mechanical or other reasons. This ***supply*** risk is based on historical experience and is 223 MW.[4] Under the Virginia-Carolina ("VACAR") Reserve Sharing Agreement, DESC is also obligated to maintain spinning reserves of approximately 200 MW of capacity.[5] The result is a target capacity reserve of 980 MW, or 21% of normal peak winter demand, as shown on **Figure B.**

Figure B: DESC's Reserve Calculation for Summer and Winter Peak Periods

Reserve Margin	Summer	Winter
Demand-Side Risk (Extreme Weather)	245	557
Supply-Side Risk (Generation Forced Outages)	234	223
VACAR Reserves	200	200
Total Reserve MWs	679	980
Normal Peak Demand	4,763	4,855
Reserve Margin %	14.3%	20.2%
Reserve Margin Policy	14%	21%

The summer reserve margin is computed in the same way. But, in the summer, the difference between normal and extreme weather peak demands are not as great, in large part because air conditioning load can increase only so much no matter how much hotter the weather becomes.

[3] A detailed description of the derivation of forecasted peak demand is found in the Prefiled Direct Testimony of Dr. Joseph Lynch in Docket No. 2019-226-E, Exhibit JML-3 pp. 1–10.

[4] A detailed description of the derivation of this 223 MW capacity risk reserve is found in the Prefiled Direct Testimony of Dr. Joseph Lynch in Docket No. 2019-226-E, Exhibit JML-3 pp. 10–15.

[5] How the VACAR reserve sharing agreement works in practice is explained in detail in the Prefiled Rebuttal Testimony of Dr. Joseph Lynch in Docket No. 2019-226-E pp. 17–20.

Forecasts are never free of uncertainty. But this 21% reserve margin is a reasonable forecast of the resources needed to meet customer demands during future extreme winter weather events. Statistical analysis based on historical experience since 1991 shows that with a 21% reserve margin, DESC should be able to meet customers' demands with its own resources in every day but one day out of 10 years. This is a recognized industry standard. In addition, DESC's winter and summer reserve margins are consistent with those maintained by neighboring utilities and the PJM regional transmission organization. Additionally, ORS's experts reviewed DESC's reserve margins in the most recent IRP proceeding and found them to be reasonable.

Since 1980, DESC's service territory has experienced six winter weather days more extreme than those captured in the data that DESC uses to plan its electric system. The coldest day during the period from 1991 to 2020 was January 18, 1994. The average temperature on January 18, 1994 was 22.5 degrees. This was the seventh coldest day during the period from 1980 to 2020. The coldest day since 1980 was January 20, 1985. The average temperature that day was 14.25 degrees. There have been only two days since 1980 with average temperatures below 19 degrees and they were not on consecutive days.

The 21% reserve margin is sufficient to cover about 85% of the winter peak days from 1980 to 2020. To cover 100% of these winter peak days would result in a reserve margin equal to 30.5% of normal peak winter demand. If that additional reserve margin was filled by the most economical form of dispatchable generation available today (Large F Frame combustion turbines), the cost would be approximately $382 million. The load forecasting data indicate that the capacity represented by these units would be needed only for several hours a day on a handful of days over 40 years. DESC has determined that the cost to customers from maintaining a reserve margin of this size is disproportional to the risks involved.

Would disruption on the scale of what happened in Texas be likely if DESC's territory experienced more extreme weather than is currently planned for?

The winter peaks on DESC's system usually occur in January and February and typically last several hours in the very early morning and dissipate as the day progresses. Furthermore, extreme cold temperatures typically moderate in the days following the arrival of a winter storm. If past conditions are a reliable guide, any capacity shortfalls on DESC's system would most likely occur only during a handful of peak hours during one or two days at the beginning of a winter storm. In extreme cold weather events, other utilities could be stressed to the extent that they could not provide support during peak period on the initial days of a storm. For that reason, controlled load shedding might be necessary. But if past conditions are a reliable guide, service interruptions could likely be kept to a short duration with only a limited number of customers impacted. Load shedding would not be likely to be required outside of the morning peak period during one or two days.

Once the worst impacts of the storm were absorbed, it is reasonable to assume that additional capacity would likely be available from neighboring utilities to allow DESC to weather the remaining challenges. Dominion Energy is part of the Eastern Interconnection that stretches from the Maritime Provinces of Canada, to Florida, through Kansas, Nebraska, and the Dakotas and from Saskatchewan, to Louisiana. Membership in the Eastern Interconnection allows Dominion Energy to purchase power from utilities in other states. DESC typically trades power with southeastern utilities such as Duke Energy, Santee Cooper, and Southern Company as well as independent power producers with generation facilities in the region. But when the need is acute, DESC has moved power into its system from as far away as Missouri or Michigan.

In contrast, the Texas grid is not part of the Eastern Interconnection and has very limited capability to buy power from outside the state. While this design allows its transmission and wholesale markets to operate outside of Federal jurisdiction, the resulting isolation placed Texas grid operators in a position where they could not call on material assistance from other states when the Texas electric grid began to fail in 2021.

During the 2021 event, neighboring states like Oklahoma experienced colder weather than Texas, and required controlled load shedding (rolling blackouts) for several hours on the first morning of the storm. But they experienced nothing like the widespread and multi-day blackouts suffered by customers in Texas. After the first day or two, the utilities in other states might have been in a position to help Texas restore service to its customers if interconnections had been available.

Our Comments

The 2014 Polar Vortex in South Carolina and DESC's Response

January 7, 2014 turned out to be the tenth coldest day in DESC service territory since 1980.

In 2014, the Polar Vortex brought a rare combination of very cold temperatures and high winds to DESC's service territories. January 7, 2014 turned out to be the tenth coldest day in DESC's service territory since 1980. The forecasted load, 4,850 MW, was high but within the range for which the system was planned. Planners began the day with a forecasted reserve of 560 MW.

What was not expected was that the combination of cold temperatures and high winds would overwhelm steam supply line heating circuits at two plants and force a major block of generation capacity offline before sunrise on January 7th. Frozen steam supply lines forced Urquhart 1 and 5 off line shortly after 2:00 am and Williams Station shortly after 6:00 am. Later that morning, another unit, Urquhart 4 tripped off line also for weather reasons. Upstream natural gas pipelines curtailed interruptible gas for electric generation, and DESC was required to switch certain gas units over to their alternate fuel source. Problems with the control systems at multiple units prevented them from restarting using their alternate fuel. In all, DESC lost 1,100 MW of generation during the morning peak.

During the critical peak hours, purchased power from other utilities was not available anywhere in the region. In the very early morning hours, some Emergency Power was available from VACAR. But as the morning peak began, those utilities needed that power back to meet their own needs and they began withdrawing it. There was not enough power remaining to cover the resulting deficit and interruptible customers were called upon to curtail service. Public appeals were made and system voltage was reduced.

DESC instituted controlled load shedding between the hours of 7:00 am and 11:00 am. In all, 54,000 customers (or about 7% of DESC's customer base) were impacted. The average loss of service was for 39 minutes. All service, including service to interruptible industrial customers, was restored as peak demands subsided later in the morning.

Immediately after this event, DESC initiated a comprehensive review of the cold weather resiliency of its generation units. DESC benchmarked all units against a then-state-of-the-art combined-cycle plant designed for use in cold weather environments.

The review found that DESC's coal fleet's older vintage heat trace systems required upgrading. The heat trace systems at the newer combined cycle gas turbines were not designed to operate in harsher conditions than 25°F and 5 mph winds. The fuel switching issues at the combined cycle units were found to have resulted from a recent software update by the original equipment manufacturer, General Electric ("GE"). Incorrect fuel control curves in those software updates prevented those units from restarting on their alternative fuel. In addition to DESC's units, nationwide, more than 50 GE units were affected.

In response, the Company invested approximately $40 million in new or upgraded wind shielding, insulation, thermal wraps and heat trace equipment at its plants. It completed all work within seven months. Under new policies, heat trace systems are required to be inspected and tested annually and certified to be functioning as required. Heat trace equipment is now tied into the plant's digital control systems allowing real time oversight by the control room operator. Visual alarms concerning temperature conditions or heat trace malfunctions are required in each plant's control room. Design specification for all new generating units include resiliency at zero degree temperatures and 30 mph winds.

In addition, DESC implemented comprehensive, system-wide protocols for dealing with extreme weather. Each generating unit must prepare and maintain a Seasonal Readiness Plan and Fuel Supply/Inventory Plan. Generation site managers must review and update those plans before each winter or summer season. These plans include detailed check lists of preparations to make whenever extreme weather is predicted as well as walk-downs of key equipment to be conducted by trained personnel. Dedicated, closed-loop communication systems have been installed for managing weather events. Roles and staffing for extreme weather response on the generation system have also been designated and a system-wide generation weather event coordinator position has been created.

In response to the Polar Vortex, DESC was able to immediately identify and implement system-wide cold hardening of its generation assets through a single, integrated program that was completed in seven months. DESC was also able to immediately institute uniform planning requirements and implement consistent operating protocols subject to direct management oversight. This was possible because DESC is a vertically integrated utility. This would not have been possible under a utility structure like that in Texas that fragments responsibility among multiple system planners, owners and operators.

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Our Comments

Forecasting Gas Distribution Loads and the Resources Needed to Meet Them

DESC's natural gas distribution system is designed to meet customers' firm peak winter demands based on a design day that reflects the most extreme winter weather experienced in its service territory since 1980.

DESC's natural gas distribution system is designed to meet customers' firm peak winter demands based on a design day that reflects the most extreme winter weather experienced in its service territory since 1980. That design day was January 20, 1985 when the average temperature was 14.25 degrees. If weather conditions on January 20, 1985 were to reoccur during the current winter heating season, firm customers behind DESC's system would require 438,988 dekatherms ("DT") of supply for the current winter season.

These design day demands determine the system's upstream gas supply and transportation capacity needs. DESC purchases interstate pipeline transportation capacity from the three interstate pipelines that can provide service into DESC's gas system. They are: Southern Natural Gas Company ("Southern"), Transcontinental Gas Pipe Line Corporation ("Transco"), and Carolina Gas Transmission, LLC ("CGT"). Interstate Firm Transportation ("FT") service is the primary resource to meet design day demands.

DESC currently holds interstate contracts for 161,144 Dt of firm capacity on Southern, 70,458 Dt on Transco, and 424,427 Dt on CGT. The upstream FT capacity on Southern and Transco combines with the more localized CGT capacity to deliver well-head gas supply and intrastate storage supply to DESC's distribution system. Additionally, the Company has contracted for winter only firm transportation in the amount of 27,000 Dts per day on Elba Express, a Georgia pipeline, for a two-year term beginning on November 1, 2019.

The interstate firm capacity allows for geographic diversity of supply by providing access to the Gulf of Mexico supply basin and the Marcellus shale supply basin. This reduces the risk associated with supply interruptions due to weather events such as hurricanes that may impact the Gulf of Mexico.

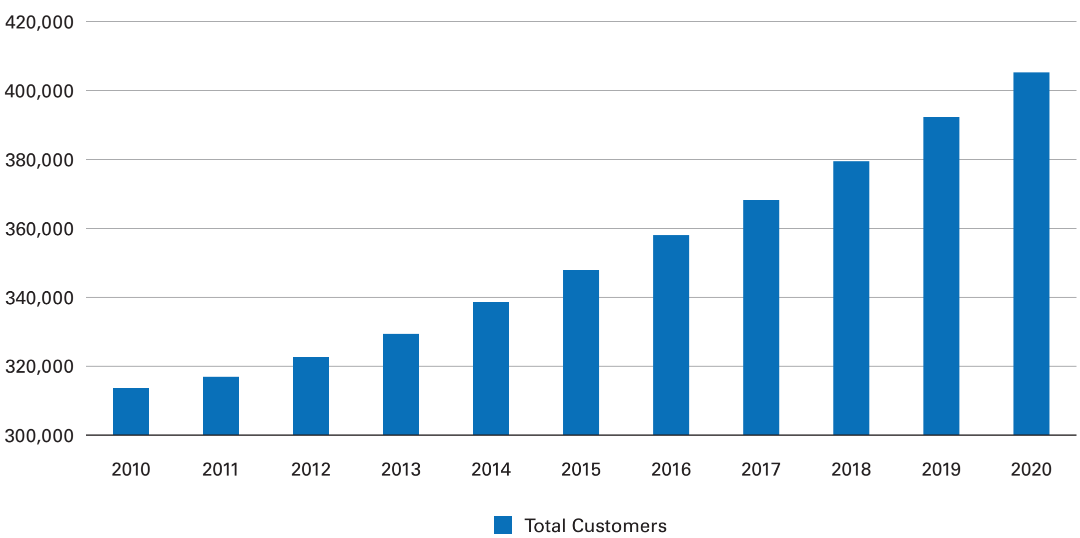
In addition to interstate storage assets, DESC owns and operates liquefied natural gas ("LNG") storage facilities located at Bushy Park and Salley, South Carolina. These facilities can vaporize LNG stored on site and inject it into the system to provide peaking service during times of extreme demand. The LNG facilities are also located on or near DESC's distribution system and provide supplies that are not subject to disruptions on upstream pipelines such as freeze-offs due to extremely cold weather or shut-ins due to hurricanes.

The LNG facilities support a maximum daily withdrawal quantity of 105 Mmcf/day. With full storage and at maximum withdrawal rates, Bushy Park's inventory would serve customers for approximately 16 days and Salley's approximately 20 days.

Considering all of these assets and based on its estimate of design day demands, DESC's gas system will have 5.67% system-wide operating reserve during the upcoming winter heating season. This operating reserve is conditional on the availability of the LNG facilities at full capacity, upstream transportation capacity to make full use of the CGT capacity, and the interstate pipelines meeting their FT commitments.

There are important reliability risks associated with this peak design day analysis. In recent years, the system has not experienced any particularly harsh weather. For that reason, current demand and hydraulic (gas flow) models have not been tested by conditions as extreme as those experienced nearly 40 years ago during the design day scenario. It is also possible that the system may experience more extreme cold weather events greater than the design day scenario where interstate and/or LNG assets will not be available when called upon. While the system is growing, as shown on **Figure C,** firm capacity on interstate pipelines is fully subscribed. Without successful pipeline expansion projects, there is no guarantee that DESC can continue to acquire gas supply volumes sufficient to meet the rapidly growing demand on its natural gas distribution system, as well as the natural gas supply that will likely be required to retire coal facilities, and to meet growing electrical demands with dispatchable, long-duration, resources. The planned replacement of aging combustion turbine units with more fuel efficient units will help mitigate this gas supply pressure.

Figure C: DESC Gas System Customer Growth



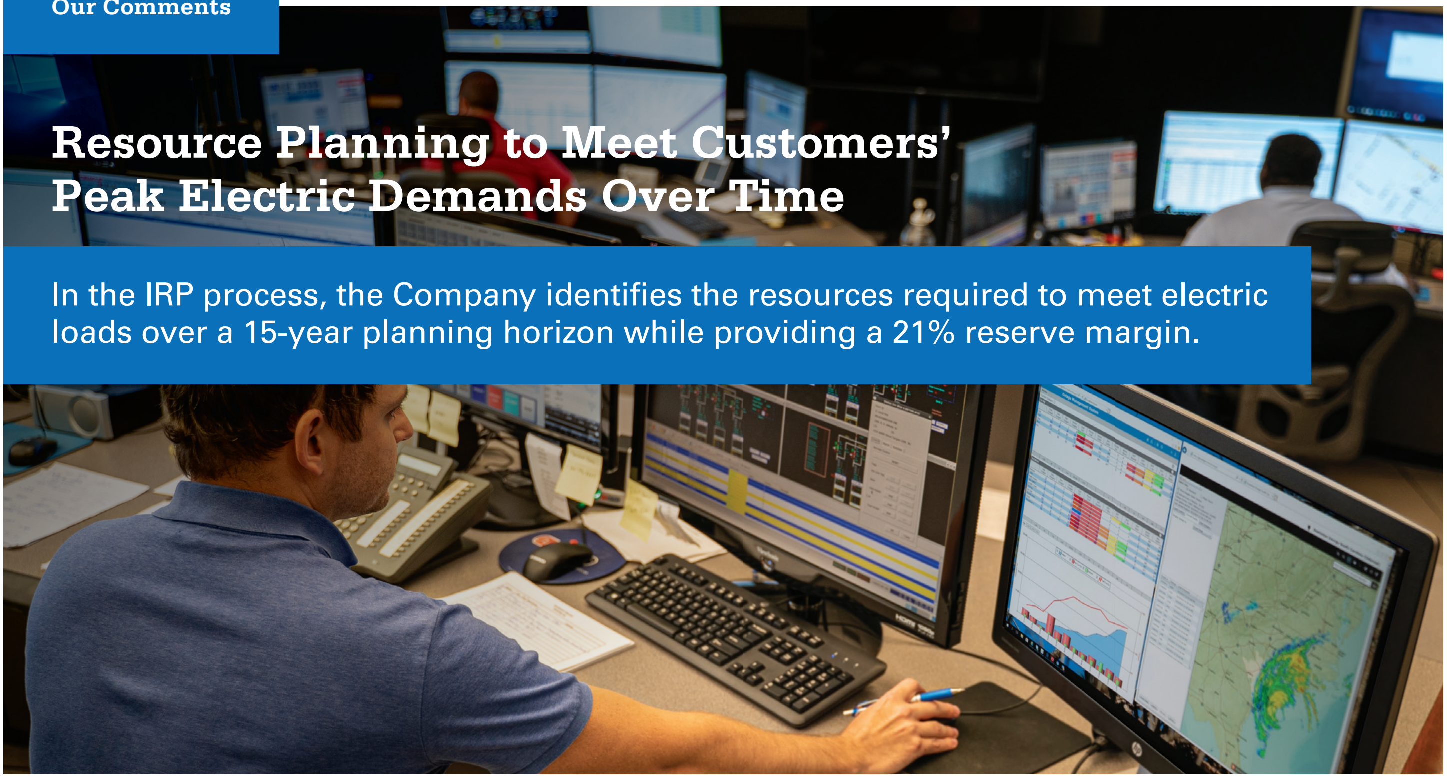
DESC believes that its current approach to modeling and providing for customers' peak winter gas requirements properly balances risks with costs. But it does not eliminate all risk of a shortfall. Should a shortfall occur, DESC would implement its Commission-approved curtailment plans as set forth in its gas tariffs. Those plans involve curtailing interruptible loads first and if necessary firm industrial and commercial loads next. The goal would be to protect service to residential and other critical needs customers in order of need.

Dominion Energy

Our Comments

Resource Planning to Meet Customers' Peak Electric Demands Over Time

In the IRP process, the Company identifies the resources required to meet electric loads over a 15-year planning horizon while providing a 21% reserve margin.



Dedicated employees at 24/7 System Control; Cayce, South Carolina.

In the IRP process, the Company identifies the resources required to meet electric loads over a 15-year planning horizon while providing a 21% reserve margin. The Modified 2020 IRP shows that absent coal plant retirements, the Company has sufficient generation resources in place today to meet both winter and summer peak demand from 2022 to the end of the planning period.[6] This is due in large part to the recent addition of the 586 MW Columbia Energy Combined Cycle Gas Facility and reductions in demand growth due to DSM and energy efficiency.

DESC also evaluates the current and future reliability of its grid under mandatory Reliability Standards for Transmission Planning (the "Reliability Standards"). These standards are issued by NERC in its capacity as the designated Electric Reliability Organization ("ERO") under the Federal Energy Policy Act of 2005.[7] In addition, each utility prepares and submits to NERC long range planning criteria that reflect its system and operating practices. DESC's NERC approved Long-Range Planning Criteria are set forth in its 2020 Modified IRP.[8]

DESC's Annual Transmission Assessment is provided to adjacent utilities for incorporation into the modeling of their systems, and available for audit by NERC.

Retirement studies are currently underway to identify what must be done to maintain the reliability of DESC's system if DESC retires its existing coal units at Wateree and Williams Stations. Those retirement studies will identify what impacts the retirement of those plants will have on the grid and the costs involved.[9] Multiple replacement options are being evaluated. Resulting retirement plans will be reviewed by the Commission in future dockets.

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[6] https://cdn-dominionenergy-prd-001.azureedge.net/-/media/pdfs/global/company/desc-2020-integrated-resource-plan.pdf?la=en&rev=bcaa0f89a3614b018995f4b43c0273e9.

[7] https://www.nerc.com/pa/Stand/Reliability%20Standards%20Complete%20Set/RSCompleteSet.pdf.

[8] See note 7, above.

[9] The letters requesting Transmission Impact Studies are available at https://dms.psc.sc.gov/Attachments/Matter/f74fc5bc-5982-40e6-87b3-93c2507822ba.

Our Comments

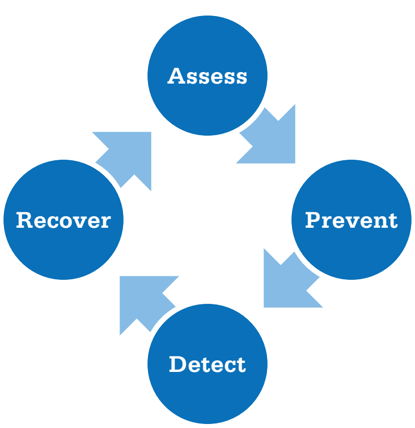
Ice Storms, Other Threats, Enterprise Risk Management and the Range of Risks to Utility Operation

Underlying all of DESC's work to mitigate weather impacts on its customers are its core commitments to safety, reliability and resiliency.

The range of dangerous weather conditions that threaten DESC's system include hurricanes; tornadoes; tropical storms; bands of violent thunderstorms and other summer storms; snow storms; king tides; flooding events caused by extreme precipitation; earthquakes; cyber-attack; electro-magnetic pulses ("EMP"); and physical attacks on infrastructure including the natural gas pipelines that represent DESC's largest source of fuel supply.[10]

DESC's Enterprise Risk Management Process assesses and formulates responses to risks in these and other areas through its Resiliency Process. DESC uses this approach in evaluating and planning for risks, and in dealing with emerging, and escalating threats in real time:

Figure D: DESC Resiliency Strategy: Access, Prevent, Detect, Recover



Using this approach, DESC plans and prepares to respond to threats on an on-going basis by conducting internal tabletop and functional drill exercises that include simulating weather events; sabotage to the electric and gas systems; accidents and failures at generation facilities; and cyber-security breaches. Federal, state, and local emergency response officials, ORS, and other community stakeholders are often invited to participate in these events alongside their DESC counterparts.

Underlying all of DESC's work to mitigate weather impacts on its customers are its core commitments to safety, reliability and resiliency.

Figure E: Safety, Reliability, Resiliency

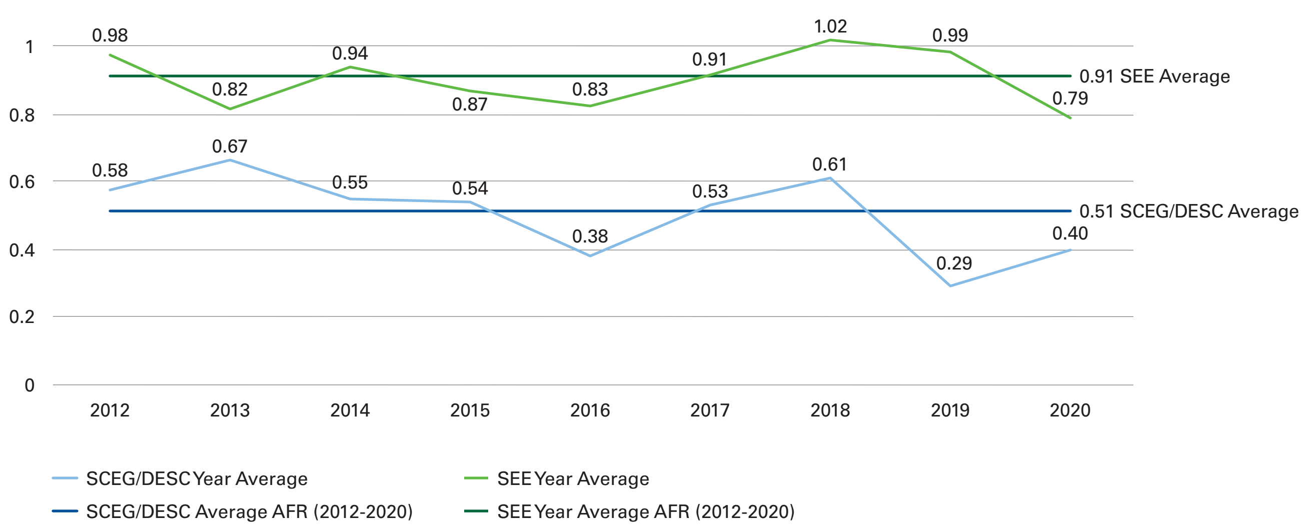
[10] Based on the letter from Governor McMaster, the petition from ORS and the directive in this matter, DESC understands the scope of this request for comments includes winter storms and peak demand due to extreme cold weather events. To the extent permitted under security rules, the Company would be happy to provide information concerning its planning for other threats if requested by the Commission.

Safety

Safety is DESC's #1 core value. Electric utility operations involve some of the most dangerous jobs in the American economy. Safe utility operations require employees to be trained to carefully identify and evaluate risks, to take personal responsibility for addressing those risks, and to anticipate the effects of their actions on their personal safety and that of their fellow employees before they act. Employees trained in this way show similar forethought, accountability and care in all aspects of their work including storm preparation and response.

Safety is measured through the accident frequency rate. In 2020, the average accident frequency rate on DESC's electric system was approximately half than the southeastern utility average:

Figure F: DESC & SEE Final Average AFRs



In 2020, DESC's gas operations were recognized by the American Gas Association for having the lowest OSHA recordable incident rate, DART rate[11] and DART severity rate among all thirteen of the medium to large gas utilities nationwide. This cultural strength extends to protecting the safety of the public as well.

[11] DART is the rate of incidents involving days away from work, restricted work activities or job transfers.

Reliability

Reliability means preventing outages. DESC prevents outages though a regular, disciplined and carefully planned cycle of vegetation management. This involves right-of-way patrolling, side-trimming, dead tree removal, understory management through selective herbicide application, and educating property owners on the proper vegetation to be planted under or adjacent to power lines.

Vegetation Management

Vegetation management on DESC's distribution system is conducted on a five-year cycle. Each circuit is taken up in rotation. Most transmission lines are maintained on a variable cycle depending on the width of the corridor and growing conditions at its location. DESC has pursued a disciplined and effective vegetation management program for over a decade now. The benefits are clearly shown in the significant reliability gains that are discussed below.

Field Inspections

DESC conducts disciplined and regular field inspections of electrical poles, transformers, and hardware. Components such as insulators, breakers, fuses, switches, transformers, wires, grounding straps and hardware are inspected to ensure they are in good operating condition. Any components that are compromised or pose a reliability risk are replaced.

These inspections typically occur on a ten-year cycle. They are supplemented by the complete replacement of aging circuits with modern steel monopoles, and investment in new smart switching and self-healing grid technology for the distribution and transmission systems.

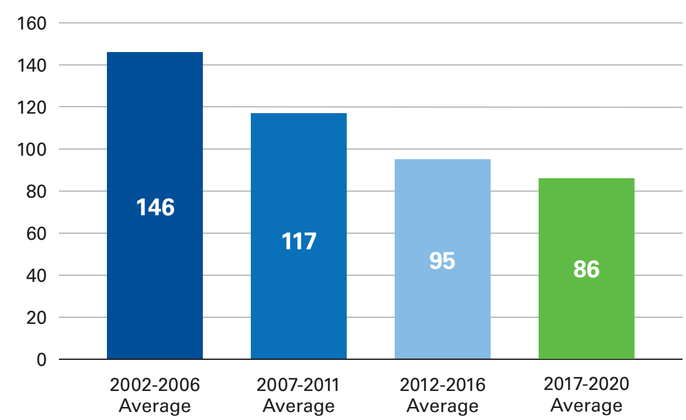
Transmission and Distribution Reliability Investments

Between 2011 and 2019, DESC invested $1.0 billion in new transmission assets and $1.1 billion in new distribution assets. These investments include construction of a highly reliable, highly resilient, steel-monopole based transmission backbone linking load centers in the Charleston area with generation resources north and east of Columbia where DESC's largest concentration of generation resources are located. DESC has similarly reinforced the transmission system serving growing areas in Columbia and the I-77 corridor, in the Lake Murray area, in Mt. Pleasant, and in Beaufort.

SAIDI Score

DESC's System Average Interruption Duration Index ("SAIDI") is the primary measure of reliability on electric systems. It measures the number of minutes per year customers are without power outside of storm restorations. In 2019, DESC provided its customers a level of reliability that was forty-nine percent better than the other regional investor-owned utilities evaluated by the State Energy Office.

Figure G: **System Average Disruption Index (SAIDI)**

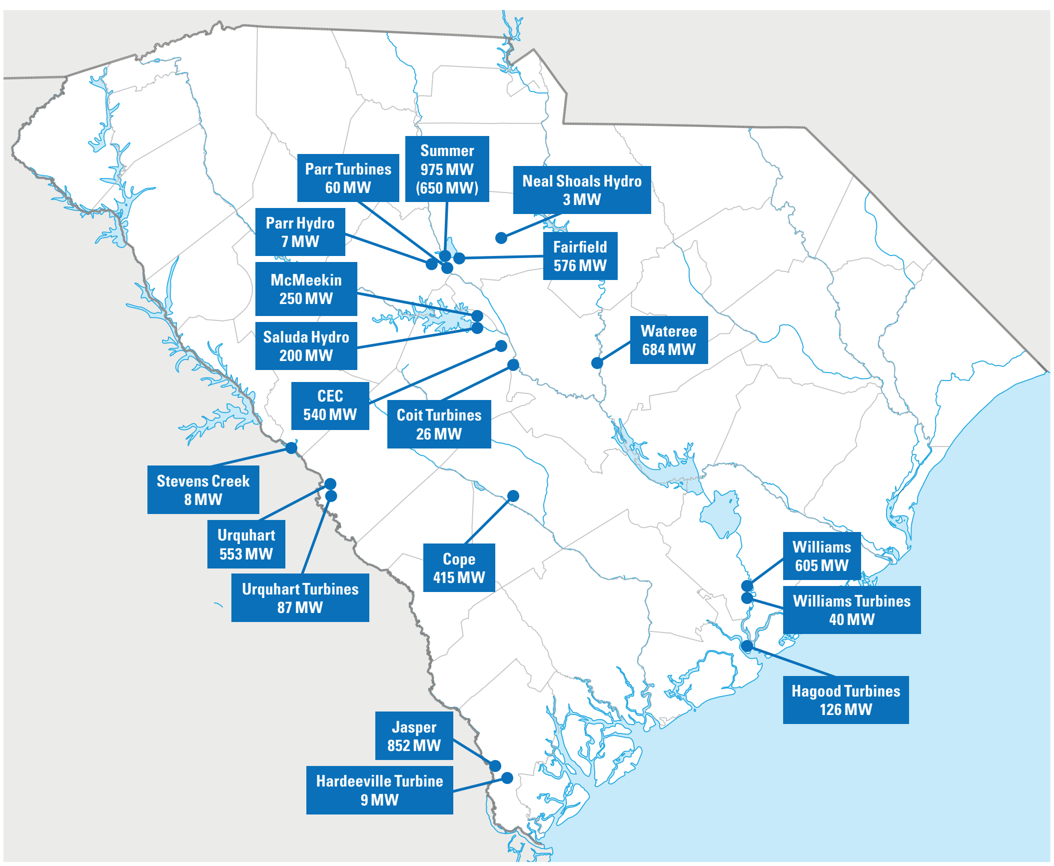


Generation Reliability

Reliability on the generation system requires prudently operating generation units day-in and day-out. This involves limiting the cycling of units not designed for rapid response to changing loads and carefully managing their thermal loading during startup, ramp-up and shut down. It involves insulating generating units from the damaging mechanical stresses that the grid can place on turbines and generators when load and demand break out of sync due to the sudden loss of transmission or generation resources.

But above all, the reliability of generation assets is maintained by carefully planning and executing maintenance outages during which aging components are replaced and inspections, repairs, and upgrades are made. This is particularly important on DESC's system since the median age of DESC's generation units is 51 years for coal units, 65 years for gas fired steam units, 49 years for internal combustion turbines and 72 years for hydro units.

Figure H: **DESC'S Major Generation Facilities**



DESC implements a carefully planned schedule of inspections, maintenance, repairs and component replacements for each of its generating stations. In planning and sequencing this work, the Company relies both on its own operating experience as well as that of companies operating similar equipment globally. It receives reports of maintenance issues and equipment failures from original equipment manufacturers, electric industry groups like EEI and EPRI, and other vendors and consultants. Maintenance outages are planned and scheduled years in advance to ensure that sufficient resources are always available to meet customers' needs. The goal is to identify and correct problems that could result in forced outages before they occur.

Asset Replacement

Generation reliability also requires replacing generation units that are reaching the end of their useful lives, as DESC is planning to do with certain aging gas-fired combustion turbine units. These units represent critical reliability and resiliency assets for the grid. Because they can start quickly with practically no advanced notice, they can be used to balance intermittent renewable resources such as solar generation and respond to grid emergencies. They also provide black start capability, which allows them to start up on their own power when the grid is down. They can feed electricity into a system that is fully de-energized.

Black start capability is critical to restoring power after blackouts and is a nuclear safety requirement for the VC Summer Unit.[12] Along with hydro resources, combustion turbines are the most valuable black start assets on the grid.

To upgrade these assets, the Company plans to retire thirteen aging combustion turbines and one steam turbine-generator set. Thirteen of the fourteen units to be retired will be 50 years old or older at the time of replacement or retirement. They are increasingly prone to breakdown and costly to maintain. Their fuel efficiency is below current standards. DESC will replace them with five reliable, highly efficient and modern aeroderivative-type combustion turbines.[13] The effect on generation supply will be immaterial because older gas turbines are being replaced by newer gas turbines and the net MW are essentially the same. The effect on reliability, fuel efficiency and carbon reduction; however, will be materially better. The Company is ready to proceed with installing these highly reliable assets but cannot do so until the Commission issues an order in Docket No. 2021-93-E authorizing DESC to proceed in the manner it has requested. The Company filed the notice of like-kind exchange under the Siting Act in March of 2021, but no action has been taken on it. Until the Commission acts, the system will continue to rely on the aging, inefficient and increasingly unreliable units that are in place today.

Root Cause Analysis

When significant equipment failures do occur within the generating fleet (and some failures are inevitable given the nature of these units), DESC convenes an objective panel of experienced personnel to conduct a root cause analysis and identify the causes that lie behind the immediate or apparent cause of the failure. These root-cause analyses identify changes in design, layout, operating plans, maintenance schedules, procedures, testing regimes or other actions that can reduce the likelihood of such events in the future. Such a root-cause analysis was done concerning the generation outages caused by the Polar Vortex of 2014 and actions taken system wide to prevent their recurrence came from that analysis.

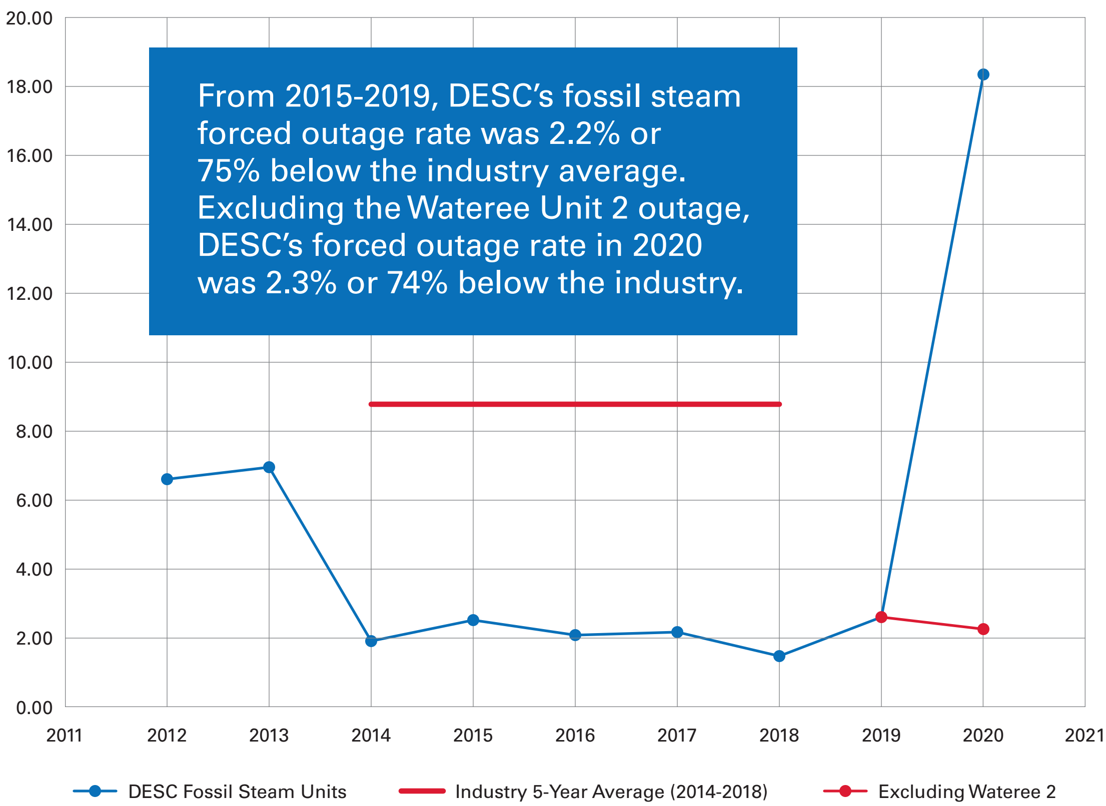
[11] https://www.wsj.com/articles/texas-electrical-grid-bigger-disaster-february-freeze-black-starts-11622124896

[12] The proposal to replace and retire these units is found at https://dms.psc.sc.gov/Attachments/Matter/c74f4a04-659e-45b1-8d8a-edffbe0fe203.

Forced Outage Rates

A principal indicator of generation reliability is forced outage rate. On average, DESC has achieved an exceptional forced outage rate for its fossil steam units which has been well below industry averages. The forced outage rate increased in 2020 due to Wateree Unit 2 entering a multi-year forced outage after a one-of-a-kind event that damaged its generator stator unit which is being replaced. The root cause was a piping configuration and piping at this and all similar units have since been reconfigured so that a like event does not occur in the future. Excluding Wateree Unit 2, the forced outage rate for fossil steam units in 2020 was 2.32%.

Figure I: DESC's Forced Outage Rate for All Fossil Steam Units (2012-2020)



Generation Investment

Between 2011 and 2019, DESC has invested over $878 million in its generation fleet. These investments include the cost of environmental and safety upgrades; the replacement of aging, obsolete, or potentially unreliable parts and equipment; and other capital maintenance.

Natural Gas Reliability

Weather threats to gas systems include extremely cold temperatures that can cause gas regulators and other components to freeze if there is sufficient moisture in the gas stream. In some cases, the installation of splash guards is required to keep splashing water from collecting as ice on regulator vents creating unsafe conditions. Extreme cold weather can cause valves to fail particularly if they are poorly maintained or worn out.

High wind events such as hurricanes, tornadoes or tropical storms typically have little impact on gas systems apart from the occasional line or regulator station that is damaged due to uprooted or falling trees. A more typical risk is flooding from hurricanes and heavy rain events, which can inundate facilities and prevent the proper operation of components. Flooded regulator and relief valve vent lines can cause these devices to malfunction because they cannot breathe properly. In response, DESC has installed permanent vent line extensions on regulator vents in certain low-lying areas. Flooding can also restrict access to facilities, preventing repairs. The gas GIS system includes flood zones and hurricane surge overlays. But little can be done to improve access short of relocating equipment to higher ground, which is expensive.

Heavy rains can result in pipeline washouts when streams overflow their banks and expose buried lines. During the floods of 2015, DESC experienced over fifty gas line washouts. Most were easily repaired by refilling the eroded area with no system impact. But in one case, a line was damaged, resulting in a serious leak. None of the other more than fifty washouts from the 2015 floods caused pipes to fail or resulted in a leak, even though pipes were often found to be supporting the weight of logs, vehicles, and other debris.

During extreme weather events, DESC monitors its gas system for evidence of such problems and responds as required. To date, there have only been limited and localized issues caused by extreme weather events on the gas distribution system.

DESC maintains and updates extensive emergency procedures to deal with events on its gas system. It conducts periodic emergency drills to test these procedures. As a member of the American Gas Association ("AGA")/Southern Gas Association Mutual Assistance Program, DESC participates in AGA's Best Practices Program for Emergency Response. DESC can call on other utilities for assistance in emergencies and provides such assistance when requested.

Resiliency

Resiliency is the ability of an electric system to withstand adverse weather and other events, and to restore power to customers quickly when lost.

Transmission and Distribution Resiliency

Vegetation management is the key driver of resiliency of the distribution and transmission system. A distribution or transmission circuit located in a well-maintained right of way will be better able to withstand the effects of ice storms, hurricanes and other storms than circuits in overgrown or poorly maintained rights of way. If storm damage must be repaired, the repair will be quicker because there will be less vegetation clogging access to the work area and interfering with the repair. A well maintained right of way is also a safer environment in which storm crews can work. Dangers will be fewer and more apparent. Lines of retreat for personnel working under entangled vegetation will be safer and less cluttered. The root cause of many injuries that occur in storm restoration efforts involve the release of the enormous potential energy stored in fallen vegetation that has become entangled in electric lines. Lines and trees often do not fall as anticipated when entanglements are released.

A second major contributor to storm damage resiliency is how well structures and equipment were maintained before the storm. Well-maintained structures and equipment are better able to withstand the effects of storms. They are also safer for line crews and the public, since the grounding circuits and other safety equipment on them can be expected to perform as intended. Structurally sound poles and well-maintained insulators and other equipment generally respond in predictable ways to the stresses that occur in clearing entangled vegetation. Poles or other equipment whose integrity or function has deteriorated due to rotting, age or corrosion can respond in unanticipated ways endangering crews and delaying restoration.

An important resiliency resource is DESC's well-established relationships with other utilities and contractors and the assurance that these relationships provide such that these groups will provide storm crews when needed in an emergency situation. The Company has developed strong relationships with neighboring utilities through years of promptly responding to requests from them for aid, and through the safety, efficiency and quality of DESC's crews' resulting work. DESC has built up a reputation for reliability and reciprocity in storm damage situations.

Generation Resiliency

DESC's generation planners prepare on an ongoing basis for storms, loss of fuel supply, freezing of equipment and other events affecting its generation resources. Root-cause analyses of events like the generation outages that occurred during the 2014 Polar Vortex are used to identify improvements in physical assets and operating practices that contribute to resiliency. Similar analyses followed Hurricane Hugo. Improvements increasing the storm resiliency of generating stations in the coastal areas were made as a result.

The single greatest resiliency concern for the generation system today is gas supply. During periods of high demand, or in case of freeze-ups or hurricanes disrupting supply, interruptible gas intended for electric generation may be curtailed. This was an issue in Texas, where deregulated generation facilities were not required to contract for firm transportation. Market structures incentivized these deregulated generation facilities to rely on interruptible gas supplies to lower their costs and maximize competitive returns. Interruptible gas was not available during much of the winter storm, and this forced many generators off line. In addition, electric load shedding forced electric driven compression on natural gas pipelines offline making it impossible to move large quantities of gas through those pipelines.

DESC supports its combined cycle units with a pool of FT to support reliability. But it also relies on alternate fuels to support generation reliability at a reduced cost to customers. DESC requires that its approximately 2,393 MW of natural gas generating units have dual fuel capability to supplement FT contracts. Each gas unit without firm gas supply must maintain at least 72 hours of alternate fuel on site, with some allowance for intervening fuel use pending replenishment on a case by case basis. All but one gas unit currently meets that standard and most exceed it.

Two interstate liquid fuel pipelines (Colonial and Plantation Pipelines) cross South Carolina. All of DESC's gas fired generating units are located within 100 miles of tank farms located on these pipelines which are potential sources of resupply. Assuming those pipelines are operating, seventy-two hours is understood to be sufficient time to identify the need for emergency replenishment of fuel oil supplies and to begin trucking those supplies to the generating units. The compressors which support the CGT system that serves DESC's gas-fired generating units are fueled by natural gas not electricity. Therefore, the loss of electric supply would not cause a loss of pressure in the gas pipeline system as occurred in Texas.

Unfortunately, solar generation can provide little meaningful reliability support for winter peak demands, since those peak demands occur in early morning hours when solar is not able to generate significant quantities of power. In addition, winter storms can involve overcast skies when solar generation is limited even during daylight hours. Solar plus storage capacity can also provide only limited resiliency value since batteries are typically sized to provide only four hours of energy without recharge. Winter storm conditions can involve several days of overcast skies, when it is not possible to fully recharge batteries using solar resources.

Additional storage in the form of batteries or other technology could be useful assets in responding to winter storms much as the Company now uses the Fairfield Pumped Storage Unit (576 MW) to store non-peak energy for use in meeting peak demands. There is no battery storage on DESC's system at present, but its use in responding to winter storms as a supplement to Fairfield Pumped Storage will be evaluated as their operating constraints are identified and they come on the system.

In the long view, an additional risk to the reliability and resiliency of the grid is the growing proportion of generation resources overall that are not owned and dispatched by the utility with the obligation to serve. The extensive growth of solar on the DESC system has contributed meaningfully to the carbon reduction achieved. However, the owners of those assets are not accountable to customers the same way the utility is, and are generally motivated by the same financial drivers as generators in the Texas model that contributed to the events of 2021.

Recent Storms

The following table lists the seven major storms that have impacted DESC's service territory since 2014. Restoration is not counted as complete until service to at least 95% of all customers affected by the storm in each county have been restored.

Figure J: Major Storm Outages and Restoration 2011-2020

Event	Dates	Total Customers Out	Days to Restore Service
2014 Winter Storm Pax	2/12/14 – 2/19/14	151,700	7
Hurricane Matthew	10/7/16 – 10/16/16	313,300	9
Hurricane Irma	9/11/17 – 9/14/17	173,300	3
Hurricane Florence	9/14/18	7,500	1
Hurricane Micheal	10/11/18 – 10/12/18	68,800	2
Hurricane Dorian	9/4/19 – 9/8/19	186,400	4
April 2020 Tornadoes	4/13/20	65,800	1

The table shows that because of the resiliency built into DESC's transmission and distribution system, the number of customers whose lights go out in a major storm is trending down, and restoration time is being reduced. Hurricane Dorian, for example, brought sustained wind speeds of over 85 miles per hour to the Charleston area, 17 hours of winds that exceeded tropical storm force, and 10 inches of rain to McClellanville. On the DESC system, there were approximately 186,400 customers without power when the storm ended. All lights were back on by Sunday evening, a little more than three days later.

Ice Storms

Ice storms occur when rain freezes on contact with trees, lines, poles and other structures. For this to happen, rain must fall through a layer of air that is warm enough to keep it in liquid form and into a second layer of air at ground level that is below freezing. Icing occurs when rain freezes on vegetation or structures before it can run off to the ground. Often the rain falls in a supercooled state, where its temperature has fallen below the freezing point but freezing itself is prevented by the buffeting of the water droplets as they fall through the air. When this buffeting stops, freezing can occur instantly.

In DESC's system, ice storms principally cause damage when trees and limbs overloaded with ice lean or fall into the distribution or transmission lines. The weight of the vegetation can snap or tangle lines, snap or twist poles, and destroy insulators and fittings down the line of the circuit.

The ability of a utility system to withstand damage from ice storms is a function of the quality of vegetation management on the circuits affected and the strength and quality of the poles, insulators, connections and other fittings on those circuits. Resiliency is greatest on circuits with well-maintained rights of way and sound, modern and regularly inspected poles and equipment. The Company's disciplined programs for vegetation management and for the inspection, renewal and replacement of assets in the field are key to mitigating the effects of ice storms on customers.

Ice storm restoration presents unique challenges compared to restoration after other storms. Ice storms occur when daylight hours are short and temperatures are cold. Work at the beginning and end of shifts has to be done under spot lights, which is challenging. The cold makes it difficult for crews to work efficiently for extended periods of time.

The scope and nature of damage from ice storms is not reasonably predictable in advance, as it often is with hurricanes, tropical storms, and tornadoes. Ice storm damage depends on the precise temperature and thickness of the warm and cold layers of air that produce icing. If the cold layer is too thin or not quite cold enough, the precipitation falls as rain that does not freeze on trees or structures before running off. If the cold layer is too cold or too thick, the result is sleet. The balance of factors can vary over small distances and with minor changes in topography. Ice accumulation and the damage it causes can only be conclusively determined through on-the-ground inspection after the fact.

Wind is the force that causes many trees and limbs to fall once they are over weighted. For that reason, the damage from ice storms depends on the strength and direction of winds or wind gusts in the immediate area after ice has formed. Wind can also weaken trees and their limbs and root systems incrementally so that they fall only after being strained multiple times. Therefore, if cold weather persists after the storm, damage can continue to occur long after the ice storm itself has passed. Often, lines have to be repaired multiple times during the storm restoration effort as additional trees and limbs fall on the newly repaired lines. At times, restoration efforts have had to be suspended in some case for days due to the danger to line crews from falling trees and limbs, a danger that may remain until the ice melts.

All this makes ice storm recovery slower and more difficult than recovery from more intense warm-weather storms. Cold can intensify the disruption to customers and property damage to homes and businesses, as happened in Texas. The evolving nature of the damage to the electric system can result in customers seeing their power lost and restored multiple times over the course of a single restoration effort. This can be difficult for customers to understand. Managing customer expectations and perceptions during an ice storm can be supremely challenging. For all of these reasons, ice storm restorations are often more difficult and frustrating than hurricane restorations.

The Storm Response Process

DESC continually updates and trains its personnel on its storm response plans which include response to ice storms, along with hurricanes, tropical storms and other storms. If a storm is forecasted to potentially impact ten thousand or more customers, DESC leadership will activate the Emergency Operations Committee (the "EOC"). The EOC then serves as the incident command structure for the weather event.

The EOC membership is comprised of approximately one hundred employees in South Carolina. A primary function is to provide logistics, communications, and back office support to the DESC employees working in the field to restore service. Examples of EOC functions include:

- Standing up secure staging sites; stocking these sites with necessary poles, transformers, wire, and other equipment and work tools necessary for restoration.
- Ensuring company vehicles are fueled, weatherized, and protected during the predicted weather event; and ensuring that vehicles do not run out of fuel later.
- Securing and installing mobile IT and communications facilities to link crews in the field with dispatch.
- Securing food, lodging, and laundry service for company crews, contractors, and mutual aid providers.
- Supporting the South Carolina Emergency Management Division's Command Center 24/7.
- Performing liaison work with key stakeholders including the Executive Director of ORS, state government elected officials and agency staffs, local government representatives, and community leaders.
- Activating a roster of hundreds of company employees trained for "storm duty" outside of their routine job assignments to assist with answering customer phone calls; calling customers back to relay information requested; assisting customers with outage verification letters needed for state food assistance; and providing support as needed in our electric and gas crew quarters.
- Providing updates to be shared with the media and our customers across the Company's communications channels.

The EOC remains activated until all customers are restored.

Call Centers and Customer Assistance in Storm Response

During extreme weather events, DESC communicates with its customers through multiple channels. In addition to news media, social media and other public sources, those channels include its mobile app, its website, its interactive voice response ("IVR") system, email, SMS texts, and live calls with customer representatives.

In a storm, both the website and the mobile app automatically display proactive messaging and include links for customers to report an outage or check the service status at their home or business remotely. Reporting an outage takes seconds using the mobile app. As of April 2021, approximately 75% of customer power outages were reported through self-service channels. Service status and restoration information is directly uploaded from the field to the website and mobile app which provide both county and regional map views.

Calls to the contact center are initially answered by the IVR system that authenticates the customer's account through telephone number recognition and predicts why customers may be calling. If identifying the account indicates that it is likely that the customer is experiencing an outage, then outage reporting and information scripts are triggered. In 2020, 44.1% of customer calls were successfully managed through IVR. The Company's overall satisfaction rating for its call centers through April 2021 was 9.34 on a 10-point scale.

Because DESC's White Cross Customers are especially vulnerable to service disruptions because of disabilities or medical conditions, the Company calls them ahead of a major storm to urge them to make preparations and relocate to shelters. Customer assistance personnel staff a special storm center desk to assist medically challenged and disabled customers in locating shelters that can meet their specific needs.

Our Comments

Conclusion

All parties, …but most of all DESC's customers, share an acute interest in South Carolina getting its reliability and resiliency policies right so that utilities can make investments in the projects that make the grid reliable and resilient.

In conclusion, an event as extreme as the Texas winter storm of 2021 is not likely to occur in DESC's service territory. Moreover, in response to the 2014 Polar Vortex DESC prepared its system for future extreme weather by cold hardening its generation system and revamping its extreme weather protocols. DESC also believes that it has appropriately forecasted customers' demands during reasonably foreseeable extreme winter weather events and has made appropriate provisions to meet those demands, realizing that all such planning involves uncertainty.

DESC's safety, reliability, and resiliency accomplishments are extensive and genuine. The Company has created a strong utility operating culture and has invested in the assets and programs needed to support a strong and resilient grid as its safety, reliability and storm restoration records show. Maintaining the current levels of reliability and resiliency will depend upon maintaining a culture of continuous improvement, continuing to evaluate opportunities for new technology, and regulatory support to make consistent and disciplined investments.

The transition that is occurring in the energy industry as zero net carbon objectives are pursued will challenge grid reliability. Major investments in grid infrastructure will be required. In this transition, South Carolina will be confronted with energy and regulatory policy choices concerning how to provide for the investments that are needed to preserve reliability. The failure of the electric system in Texas shows that mistakes in energy and regulatory policies concerning reliability can lock in adverse outcomes for customers when extreme weather comes. Poor policy choices can lead to grid failure. All parties, ORS, the Commission, the Governor, the General Assembly, the utilities, but most of all DESC's customers, share an acute interest in South Carolina getting its reliability and resiliency policies right so that utilities can make investments in the projects that make the grid reliable and resilient.

Dominion Energy®

Actions Speak Louder